Labour Market Characteristics of Workers in Six Construction Trades

Ministry of Skills Development

Ontario

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LABOUR MARKET CHARACTERISTICS OF WORKERS IN SIX CONSTRUCTION TRADES

The Ministry of Skills Development

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FOREWORD

This report presents the main findings of a research study which examined the labour force characteristics of persons qualified to work in six construction trades in Ontario. Workers in the six trades -- plumber, steamfitter, sheet metal worker, electrician, refrigeration and air conditioning mechanic, and hoisting engineer -- are required by law to have a valid certificate of qualification issued by the Ministry of Skills Development. These workers are employed not only in the construction industry, but other sectors as well (e.g. manufacturing).

For this study, the Ministry undertook a survey of certificate holders in the six trades to identify labour market characteristics such as: current labour force status (whether in the labour force or not), numbers employed and unemployed, the occupations and industry sectors in which the employed hold jobs, and the skills updating needs of certificate holders.

The survey results will be of particular interest to employers, industry associations, employees and trade unions in the construction industry, as well as to the Ministry of Skills Development which is responsible for administering Ontario's apprenticeship training program, the main source of new entrants to the six construction trades.

The Ministry wishes to acknowledge the assistance of Mr. B. Andrews of George Brown College, Mr. J. Bodring of the Plumbers' and Steamfitters' Union Local 46, Mr. S. Coleman of the Mechanical Contractors' Association and Mr. H. Carroll of the Electrical Contractors' Association of Ontario, all of whom gave valuable suggestions on the design of the survey. The Ministry also wishes to thank the nearly seven thousand certificate holders who answered and returned the questionnaires, thus making the survey a success.

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HIGHLIGHTS

- At the time of the survey, the fall of 1988, an estimated 62,845 or 82.7 percent of all certificate holders in the six construction trades, were in the labour force. Of these, 62,001 were employed and 844 were unemployed. This translates into an unemployment rate of 1.3 percent, compared to the general adult male rate of 4.0 percent at the time of the survey.

- An unemployment rate of 1.3 percent is very low and signals very strongly that employers are facing serious difficulties in recruiting qualified workers in the six trades.

- There was some regional variation in unemployment rates, with Central Ontario at less than 1.0 percent and Northern Ontario at 2.8 percent. However, the number unemployed in the North was quite small - less than 200.

- For those certificate holders who were not in the labour force at the time of the survey, close to 80 percent were retired while another 18 percent cited illness or disability for having withdrawn from the labour force.

- Certificate holders in the six construction trades are more likely to be self-employed than are other members of the labour force. About 18 percent are self-employed compared to 12 percent in the Ontario work force as a whole.

- Of employed certificate holders, an estimated 65.8 percent (40,789) work in construction and 33.8 percent (20,987) hold jobs in other industries.

- Across the six trades, 57.8 percent of certificate holders in the construction industry -- an estimated 23,573 workers -- actually work with the tools of the trade as their main job function. This is the stock of certificate holders in the six trades actually available to employers in the construction sector at the time of the survey to work on construction sites with the tools of the trade.

- For those not working with the tools of the trade as their main job function, a high proportion in this category have set up their own business or moved into managerial or supervisory jobs.

- The construction industry is an important source of labour for other economic sectors. Of the approximately 21,000 certificate holders who work in other sectors, 72 percent had previously worked in construction. Sixty percent of workers who left construction to work in other industries did so before they were 34 years of age.

- Laid off from a job and desire for more job security are the two most important reasons among workers who have left the construction industry to take jobs in other sectors of the economy.

- Within the construction sector, the labour market is very dynamic. Only a third of certificate holders in the six trades work exclusively in one sub-sector; 16 percent work in just two sectors. Over half work in three or more sub-sectors.

- Attrition due to ageing and retirements will reduce the labour force in the six trades by an estimated 15,380 workers -- approximately one-quarter of the existing stock of workers -- over the next ten years.

- The need to meet replacement requirements as qualified workers retire will be an important issue over the next decade.

- About 50 percent of certificate holders believe that the need for skills updating is either very or somewhat urgent.

- About 23 percent of respondents were aware of the Trades Updating Program offered by the Ministry of Skills Development. Of those who were not aware of the program, 83 percent requested information on the program.

- Skills updating programs in computers, computerized control systems, equipment handling, trouble shooting, and schematic reading are high priorities for persons employed in the six trades.

CHAPTER 1

INTRODUCTION

Objectives of the Survey Research Project

A better understanding of the labour market characteristics of workers qualified to work in highly skilled trades is needed in order to develop policies and programs to help meet future requirements for workers in these trades. Skill shortages have recently developed in the construction trades, leading to bottlenecks in the supply of construction services. A profile of the current labour force status of certificate holders in the six construction trades provides a basis for assessing the current supply situation and for analysing the impact of ageing and retirements on future replacement needs.

More precise labour market information on persons in the skilled trades is also necessary to provide a more informed basis for current discussions on labour market policy. The federal government is restructuring its labour market policies, and is reallocating about $1.3 billion in Unemployment Insurance funds for training purposes.[1] In designing its new labour force development strategy, the federal government has announced it will seek the views of provincial governments on ways to improve apprenticeship training programs.

Regulations under the Apprenticeship and Tradesmen's Qualifications Act require journeymen in the six construction trades surveyed -- plumber, steamfitter, sheet metal worker, electrician, refrigeration/air conditioning mechanic and

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[1] Success in the Works: A Labour Force Development Strategy for Canada, Employment and Immigration Canada, April, 1989.

hoisting engineer -- to have a certificate of qualification to practice their trade in Ontario.[2] Certificate holders must register with the Ministry of Skills Development and renew their certificate every three years. Registration data on file with the Ministry, however, is not alone sufficient to identify the kinds of work registrants typically do, the actual stock of skilled workers available to work in the construction industry, or other useful labour market information.

Consequently, it is necessary to rely on survey information to estimate the actual labour force activity of registered workers.

The objectives of this survey research project included:

- to determine the labour force status of certificate holders registered with the Apprenticeship Branch; that is, to derive estimates of the numbers of employed, unemployed and those who have withdrawn from the labour force;

- to identify industries and occupations in which certificate holders are employed;

- to gain insights into the pattern of movement by certificate holders from construction into other industry sectors;

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[2]The job content of these trades, along with the prescribed programs of training, are defined in Regulations under Ontario's Apprenticeship and Tradesmen's Qualification Act. The following are the Regulations which apply: Regulation 52 (Plumbers), Regulation 124/73 (Steam Fitters) Regulation 298/73 (Sheet Metal Workers), Regulation 32 (Electrician), Regulation 612/73 (Refrigeration and Air Conditioning Mechanics), Regulation 619/82 (Hoisting Engineer).

- to provide an analysis of future replacement needs attributable to the ageing of the work force and retirements; and,

- to seek workers' views on training and training needs in their particular trades.

Economic And Labour Market Environment at the Time of the Survey

At the time of the survey, fall of 1988, Ontario was in its seventh consecutive year of economic growth. In construction, as in many other sectors in Ontario, seven years of sustained demand had led to labour shortages in a number of highly skilled occupations.[3] These shortages have widespread implications. For example, shortages in construction trades were a contributing factor to delays in meeting housing demand in southern Ontario.[4]

Further shortages of qualified workers in the construction trades has impacts beyond the housing component of the construction industry. Construction services can contribute to the success of sectors which are undertaking expansion in response to market demand or technological innovations to improve their competitive position. Shortages of construction workers characteristically result in bottlenecks, causing delays in construction projects. One of the consequences of such delays is a reduction in the capacity of business to respond to expanding market opportunities. Qualified workers in the construction trades

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[3]For a discussion of the impact of economic conditions on the labour market, including occupational and skill shortages in the construction industry, see Adjusting to Change: An Overview of Labour Market Issues in Ontario, Ministry of Skills Development, June, 1988.

[4]Robinson, G., "The Skills Shortage and What to do About it," Challenges, Winter, 1989, p. 9.

are also a resource to other industries. It is not unusual for qualified tradesmen to take jobs in areas such as manufacturing and service industries.

While the most recent shortages have surfaced during a period of economic expansion, the trend towards skilled labour shortages in many regions can be expected to continue and to be exacerbated by demographic factors over the longer term. Over the next decade there will be a substantial reduction in the rate of growth of Ontario's labour supply and an ageing of the work force, factors which will create an environment of labour shortage rather than labour surplus.

The development of programs to alleviate shortages in high skill technical trades requires substantial lead time. For program and planning purposes, it is important to have current labour market data, as well as information on retirement patterns and replacement needs, and on the needs of workers for skills upgrading.

Survey Design and Data Quality

The survey was conducted in late September and in October of 1988, and constitutes a snapshot representative of the target population at that time. The timing was chosen to avoid complicating seasonal factors such as winter layoffs and peak summer work loads.

The sample was drawn from the list of certificate holders and was designed to ensure sufficient numbers of respondents in all regions of the province, and in all six trades. The actual sample size required was doubled on the assumption that a 50 percent response rate would be achieved in this survey. Questionnaires were mailed to 14,903 registered holders of certificates of qualification in September; those

who did not respond within six weeks received a reminder by mail in October.

The survey response rate was 44 percent. Analysis of respondents and non-respondents indicates that respondents are an unbiased representation of the target population.[5]

Structure of the Report

Following this introduction to the research study, the next two chapters provide an examination of the market characteristics of certificate holders (numbers in the labour force, employed and unemployed), and the industry and occupational distribution of employed certificate holders by trade.

Chapter 4 focuses on the movement of workers from the construction industry to other sectors of the economy and their reasons for leaving construction, while Chapter 5 discusses the dynamic nature of the construction industry labour market. Retirement patterns and estimated replacement needs by trade is the topic of Chapter 6, and skills upgrading needs of employed certificate holders is the subject of Chapter 7.

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[5]See Appendix III for a technical discussion of the survey design and an assessment of the response and sampling error.

CHAPTER 2

LABOUR MARKET CHARACTERISTICS

Certificate Holders in the Labour Force

At the time of the survey, about 75,000 people were registered with the Apprenticeship Branch of the Ministry of Skills Development as holders of valid certificates of qualification in the six trades. As shown in Table 1, electricians account for the largest number of certificate holders while plumbers constitute the second largest group.

From the survey results, it is evident that a count of certificate holders registered with the Apprenticeship Branch overstates the number of workers actually in the work force. Some persons, while continuing to renew their certificates of qualification, have withdrawn from the labour force. Persons in this category account for about 15 percent of registered certificate holders (Table 1). The proportion not in the labour force is highest for hoisting engineers and lowest for refrigeration and air conditioning mechanics, which as will be shown later reflects the age distributions of certificate holders in these trades. Overall, the total number of persons in these six trades who were in the labour force as of October 1988 was 62,845 workers, rather than the 75,000 workers registered as holding valid certificates.

About 84 percent of certificate holders were in the labour force, which is higher than the Ontario adult male participation rate of 79.4 percent. In this comparison and others which are made later in the report, Ontario's male labour force is used for comparative purposes because there are very few women working in these trades.

The higher than average participation rate for persons in the six construction trades is consistent with findings from an earlier study on the motor vehicle mechanic trade, which found that 83.8 percent of certificate holders were in the work force.[6] Labour force participation is highest for refrigeration and air conditioning mechanics (89.7%) and lowest for electricians (82.0%).

Table 1

Labour Force Status of Certificate Holders by Trade, Ontario, October, 1988

Trade	Total Certificate Holders*	Labour Force Status				
		In The Labour Force		Not In The Labour Force		Not** Specified
		Number	%	Number	%	%
Plumber	14,006	12,125	86.6	1,846	13.2	0.2
Steamfitter	5,364	4,439	82.7	896	16.7	0.5
Sheet Metal	7,237	6,367	88.0	851	11.8	0.3
Electrician	36,632	30,043	82.0	6,186	16.9	1.1
Refrigeration and Air Conditioning	2,927	2,625	89.7	290	9.9	0.4
Hoisting Engineer	8,786	7,246	82.5	1,512	17.2	0.3
Total*	74,952	62,845	83.8	11,581	15.4	0.7

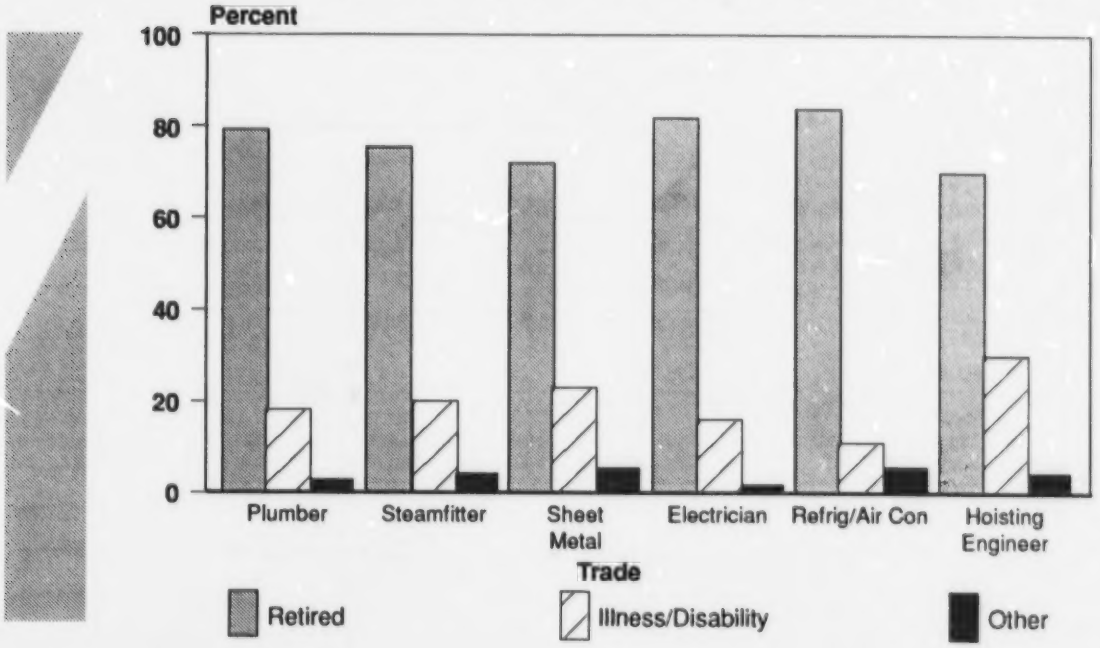
* May not sum to totals or 100 percent due to rounding.

** Persons who returned questionnaire but without sufficient information to allow labour force status to be determined.

[6] Motor Vehicle Mechanics in Ontario: Labour Force Characteristics, Ministry of Skills Development, Toronto, March, 1987, p. 3.

Most certificate holders not in the labour force gave as their reason retirement (79.2 percent). The next most important reason was illness or disability (Chart 1). Not surprisingly, the proportion who have left the labour force increases with age: 34 percent of certificate holders between the ages of 55 and 64 and almost 58 percent of those over age 65 are not in the work force.

Chart 1
Reasons for Not Participating in the Labour Force



Employment and Unemployment

At the time of the survey, most of the 62,001 certificate holders were employed and the unemployment rate (unemployed expressed as a percentage of the total in the labour force) was a low 1.3 percent (Table 2). This rate of unemployment is much lower than the general adult male rate of 4.0 percent at the time of the survey.

Table 2

Labour Force, Employed and Unemployment Rate for Certificate Holders by Trade, Ontario, October, 1988

Trade	Labour Force*	Employed	Unemployment Rate %
Plumber	12,125	11,931	1.6
Steamfitter	4,439	4,266	3.9
Sheet Metal	6,367	6,323	0.7
Electrician	30,043	29,788	0.8
Refrigeration/ Air Conditioning	2,625	2,604	0.8
Hoisting Engineer	7,246	7,088	2.2
Total*	62,845	62,001	1.3

* May not sum to totals or 100 percent due to rounding.

An unemployment rate of 1.3 percent reflects a very low level of frictional unemployment, and provides a strong indication of labour shortages in the skilled trades surveyed.[7] Overall, the median length of time that the 844 certificate holders were unemployed was 5.7 weeks. In addition, unemployment tended to be concentrated among older workers; 529 or over 60 percent of those unemployed were over 45 years of age.

[7]Frictional unemployment is defined as "unemployment resulting from the time involved in workers changing jobs. There may be enough vacancies for everyone but there are time lags between workers leaving jobs and taking others so even in times of full employment there are always unemployment figures resulting from frictional unemployment." A Dictionary of Economics and Business, Pan Books, London, 1986, p. 161.

The incidence of unemployment is small across all trades. It is highest for steamfitters, at 3.9 percent -- although only 173 steamfitters registered with the Ministry were actually without jobs and looking for work in October, 1988.

Thus, at the time of the survey essentially full employment existed for certificate holders in the work force, which reflects the high level of construction industry activity in 1988.

Regional Variations

There is some regional variation in the proportion of certificate holders in the six trades who are in the labour force and in their unemployment rate. The variation, however, is primarily between Central Ontario and the other three regions. In Central Ontario, approximately 86 percent of all certificate holders are in the labour force, which is around 3 to 4 percentage points higher than the level of labour force participation in South Western, Eastern and Northern Ontario regions (Table 3). The unemployment rate for persons in the labour force in the six trades was below one percent in Central Ontario and was highest in Northern Ontario, at 2.8 percent. The absolute number unemployed in the North, however, was very small-- less than 200. Consequently, assuming workers in the North were prepared to move, shortages in Central Ontario could not be eliminated through recruiting these workers for jobs in the South.

Relative to other regions, Central Ontario had the lowest proportion of certificate holders not in the labour force. As well, there is some variation between the regions in reasons for not being in the labour force. Retirement was most important in Central and South Western Ontario, accounting for 80 and 83 percent respectively for those not in the labour force. Illness or disability reasons tended to

be more important in Eastern (27 percent) and Northern Ontario (22 percent) for not being in the labour force.

Table 3

Labour Force Status, Employment and Unemployment Rate of Certificate Holders by Region

Labour Force Status Employment and Unemployment	Region			
	South	Central	Eastern	Northern
Total Certificate Holders	18,752	34,191	13,667	8,217
Total in the labour force*	15,480	29,443	11,289	6,794
Percent in the Labour Force	82.6	86.1	82.6	82.7
Employed	15,204	29,209	10,986	6,603
Unemployment Rate (%)	1.8	0.8	1.3	2.8
Percent Not in the Labour Force	16.7	13.1	16.7	16.8

* Excludes those whose labour force status was not determined.

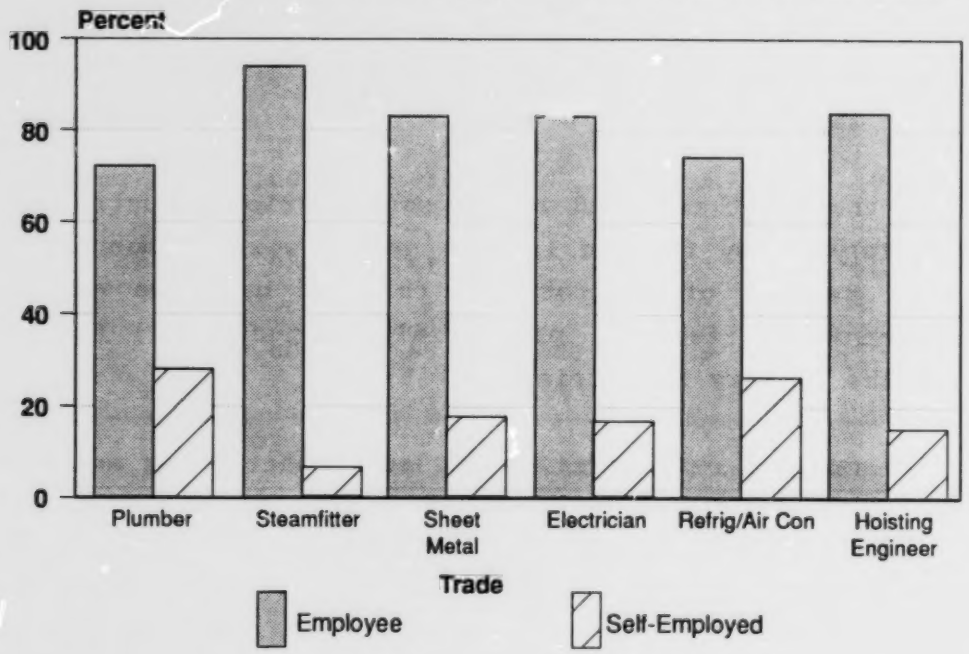
CHAPTER 3

CHARACTERISTICS OF EMPLOYED CERTIFICATE HOLDERS BY TRADE

Employee versus Self-Employed

Overall, about 18 percent of certificate holders in the six construction trades are self-employed (Chart 2), which is higher than the 12 percent in the Ontario work force as a whole who are self-employed.

Chart 2
Employed Certificate Holders by Employee or Self-Employed Status



This higher propensity to be self-employed is not surprising in light of two factors. First, a licence (the certificate of qualification) is required to practice the trade which places those certificate holders who have an entrepreneurial

bent in a good position to develop their own business. Second, capital investment is not a major barrier to establishing a business in most of these trades relative to entry into other types of businesses.

The proportion of self-employment is highest among plumbers, at 27.7 percent. Least likely to work for themselves are steamfitters, only 5.8 percent of whom are self-employed.

Employment by Industry

Of the 62,001 employed certificate holders, an estimated 65.8 percent (40,789) worked in construction and 33.8 percent (20,987) held jobs in other industries at the time of the survey (Table 4). Electricians are the least likely to be in the construction industry while sheet metal workers are the most likely.

For those not employed in the construction industry, as shown in Table 5 by far the largest number work in manufacturing--45.2 percent of the total -- followed by those who work for governments (federal, provincial and municipal) (16.3%), and in the primary industries (11.1%).

Plumbers and refrigeration and air conditioning mechanics are more likely to be engaged in the service sector and less likely to be engaged in manufacturing than are the other trades. Not surprisingly, hoisting engineers are significantly more likely to be employed in the primary industries sector.

Table 4

Employed Certificate of Qualification Holders by Trade and Industry Sector, Ontario, October, 1988

Trade	Total*	Employed in Construction Industry %	Employed in Other Industry Sectors %	Not Specified %
Plumber	11,931	76.6	23.0	0.4
Steamfitter	4,265	66.0	34.0	0.0
Sheet Metal	6,321	81.7	18.0	0.3
Electrician	29,788	58.5	41.2	0.3
Refrigeration and Air Conditioning	2,604	73.0	26.3	0.7
Hoisting Engineer	7,089	61.2	38.0	0.8
Total*	62,001	65.8	33.8	0.4

* May not sum to totals or 100 percent due to rounding.

Table 5

Certificate Holders Employed Outside of the Construction Industry by Trade and Industry Sector, Ontario, October, 1988

Trade	Total	Industry Sector						
		Primary %	Mfg. %	Trans-portation and Communi-cation %	Trade %	Service %	Federal Provin-cial and Municipal Gov. %	Other %
Plumber	2,745	4.1	31.0	3.3	3.7	20.8	29.0	8.0
Steamfitter	1,450	11.1	51.9	3.2	2.4	12.4	15.0	4.1
Sheet Metal	1,139	5.2	49.5	2.3	11.2	16.5	12.4	2.9
Electrician	12,243	10.8	51.0	5.3	3.3	10.9	14.5	4.2
Refrigera-tion and Air Conditioning	686	2.8	21.8	2.0	11.5	24.2	14.4	23.3
Hoisting Engineer	2,696	23.9	33.9	9.5	4.2	3.3	14.1	11.2
Total*	20,958	11.1	45.2	5.1	4.1	12.1	16.3	6.2

* May not sum to totals or 100 percent due to rounding.

Certificate Holders Working with the Tools of the Trade in Construction

Because of self-employment or moves into managerial/supervisory positions and jobs as planners or estimators, not all certificate holders employed in construction work with the tools of the trade. Using responses to survey questions on job titles and main duties, estimates were made on the number of certificate holders

whose primary job duties involve working with the tools of their trade; that is, estimates of the actual stock of qualified workers available to work on construction projects in the six trades surveyed.

Table 6

Certificate Holders Employed in Construction by Trade and Whether or Not Working with the Tools of the Trade, Ontario, October, 1988

Trade	Total*	Working With Tools of Trade %	Working In Other Occupations %	Not** Specified %
Plumber	9,135	52.0	45.9	2.0
Steamfitter	2,817	62.6	35.4	2.0
Sheet Metal	5,164	59.0	38.1	2.9
Electrician	17,434	56.9	39.9	3.2
Refrigeration and Air Conditioning	1,901	58.7	39.6	1.7
Hoisting Engineer	4,338	68.8	30.3	1.0
Total*	40,789	57.8	39.7	2.5

* May not sum to totals or 100 percent due to rounding.

** Persons who returned questionnaire but without sufficient information to allow their occupation and job task to be determined.

Across the six trades, 57.8 percent of certificate holders in the construction industry -- an estimated 23,573 workers-- actually work with the tools of the trade (Table 6). From the perspective of employers recruiting qualified workers in

the six trades, this is the stock of skilled workers actually available to work on construction projects at the time of the survey.

By trade, the proportion working with the tools of the trade is highest for steamfitters and hoisting engineers, consistent with the lower likelihood of persons in these trades establishing their own business.

Table 7

Certificate Holders Employed in Construction and Not Working with the Tools of the Trade by Occupation, Ontario, October, 1988

Occupation	Percent*
Owner/Operator	46.6
Managerial/Supervisory	41.7
Planners, Estimators Sales and Related	6.0
Other	4.7
Not Specified	1.1
Total*	100.0

* May not sum to totals or 100 percent due to rounding.

Of those employed in construction who do not work with the tools of the trade, about 47 percent are owner/operators (see Table 7). Forty-two percent are in managerial or supervisory positions.

It should be noted that some of those who reported they were self-employed or working in supervisory jobs will from time to time work with the tools of the trade. However, those who have established their own businesses are not available to be hired by other employers. In addition, a large majority of self-employed certificate holders and those employed in managerial/supervisory jobs do not work with the tools of the trade.

CHAPTER 4

MOVEMENT OF WORKERS FROM CONSTRUCTION TO OTHER SECTORS

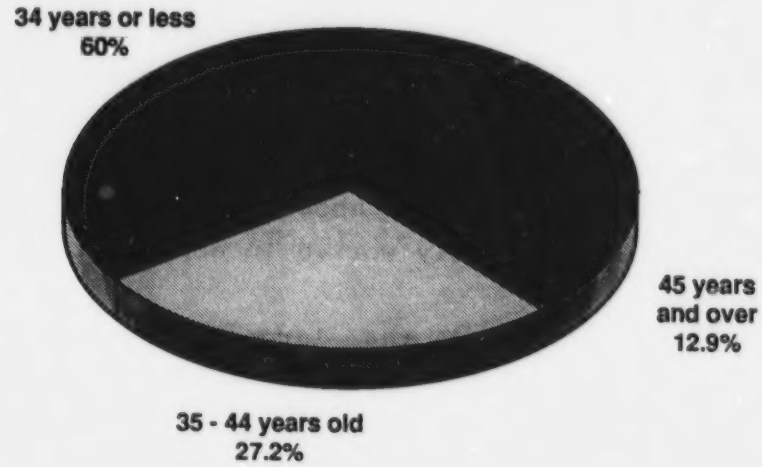
The construction industry is an important source of supply of skilled workers for other industry sectors. As noted earlier, approximately 21,000 persons qualified to work in the six trades surveyed held jobs in sectors other than construction. Of these, about 72 percent -- an estimated 15,000 -- had previously worked in construction.

The sector employing the largest share of persons who previously had held jobs in construction is manufacturing (44.7%), followed by government (federal/provincial/municipal at 17.5%), primary industries (8.8%), the service sector (7.0%) and education (6.7%).

Those who leave construction to work in another sector do so at a relatively young age. Sixty percent left the construction industry before they were 34 years old (Chart 3), which reflects the fact that labour market mobility is much higher among younger than older workers.

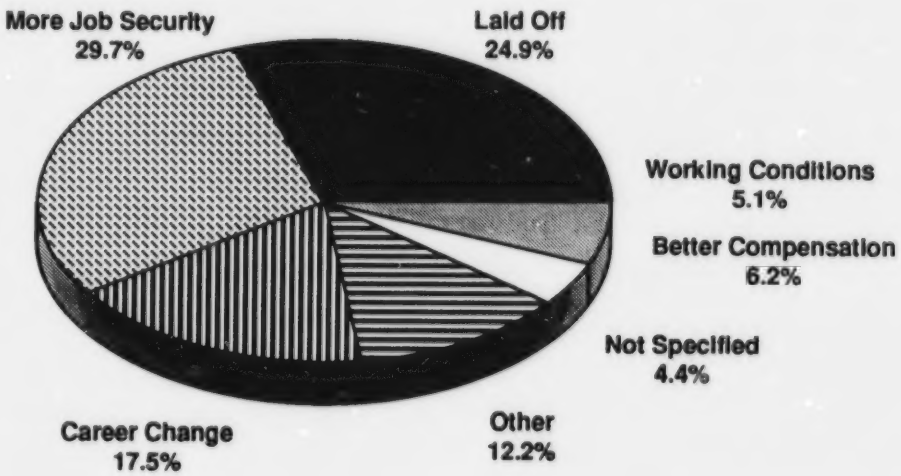
The most important reasons for leaving construction to take jobs in other sectors are related to the cyclical nature of the construction industry. Being laid off from a job in construction and the desire for increased job security accounted for 25 and 30 percent respectively of all reasons given for leaving the industry (Chart 4).

Chart 3
Certificate Holders Who Left Construction by Age



Note: Age when left construction is derived from present age minus number of years since left construction.

Chart 4
Certificate Holders Who Left Construction by Reason



Better compensation is not a major reason for leaving construction, only 6.2 percent left for higher pay. Around 17 percent left the industry because they wanted a career change.

Independent of the reason for leaving construction, there is a relatively low likelihood that those who have left the industry will return. As shown in Table 8, 44 percent indicate that it is very unlikely they will return, while 17 percent indicate a return to construction somewhat unlikely. As well, and perhaps not surprisingly, the longer a person has been out of the construction sector, the less likely is a return to the industry.

Table 8

Employed Certificate Holders Who Previously Worked in Construction by Probability of Return to Work in Construction, Ontario, October, 1988

Years Since Last Worked in Construction	Probability of Return					
	Very Unlikely %	Somewhat Unlikely %	Very Likely %	Somewhat Likely %	Don't Know %	Not Specified %
Less Than 1 year	16.1	11.9	34.1	26.3	11.5	0.0
1-2	27.2	29.6	20.1	16.6	6.4	0.1
3-5	26.9	17.6	11.0	20.4	21.3	2.8
6-10	42.0	18.9	7.6	19.1	12.2	0.2
10 or more	57.5	12.3	9.6	7.8	10.8	1.5
Total*	44.0	17.1	11.1	14.8	12.4	1.2

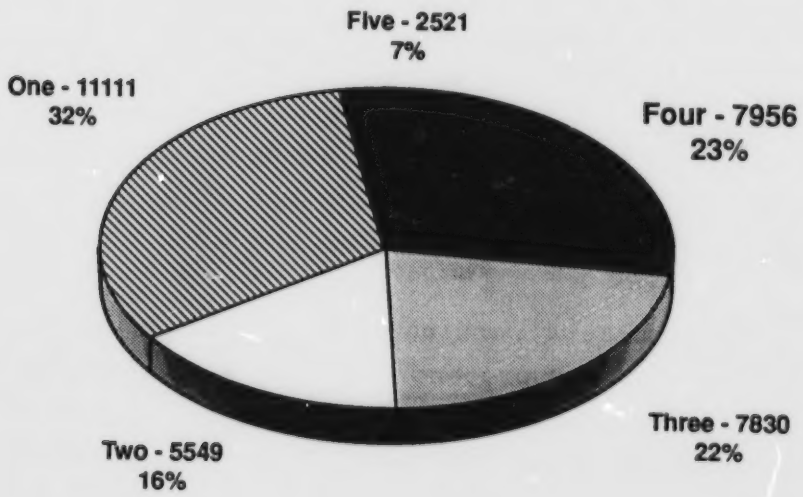
* May not sum to total or 100 percent due to rounding.

CHAPTER 5

THE DYNAMIC NATURE OF THE CONSTRUCTION INDUSTRY LABOUR MARKET

It is generally accepted that the construction industry is project driven, and that the industry's work force has to be mobile and flexible. Evidence from the survey strongly supports this view. Respondents were asked to report in how many of following industry sub-sectors they had worked: residential; industrial, commercial or institutional; heavy industry/utlilties; service and maintenance; renovation; other construction services (e.g. project management, inspection, etc.). Only one third of certificate holders worked exclusively in one sub-sector; while 16 percent worked in just two sectors (Chart 5). Over one half work on projects in three or more sub-sectors. This ability to move between sectors in the construction industry reflects the broad-based and in-depth training of qualified workers in the six trades.

Chart 5
Employed Certificate Holders in Construction by Number of Industry Sub-Sectors in Which They Work



The dynamic nature of the construction labour market is also reflected in the length of time certificate holders have worked with their present employer. About 30 percent of those working with the tools of the trade in construction had been with their current employer less than a year (Table 9).

Table 9

Employees Working with the Tools of the Trade by Length of Time with Present Employer and Industry Sector, Ontario, October, 1988

Length of Time with Present Employer	Sector	
	Construction %	Other Industry Sectors %
1 year or less	30.4	11.9
2-3 years	16.3	10.2
4-5 years	9.7	6.3
More than 5 years	42.1	71.6
Total*	100.0	100.0

* May not sum to 100 percent due to rounding.

In contrast, those who worked in other industries have more stable and long-term employer-employee relationships. Almost 72 percent of those employed in other industries had been with the same employer for more than five years, compared to only 42 percent in the construction sector.

Certificate holders working with the tools of the trade who had been with their present employer less than two years were also asked to report the number of employers for whom they had worked during the previous two year period.

On average, persons in this category had worked for 3.2 different employers during the two year period. Again, this high level of mobility is consistent with the labour market needs of an industry which is project driven and requires a flexible and adaptable work force.

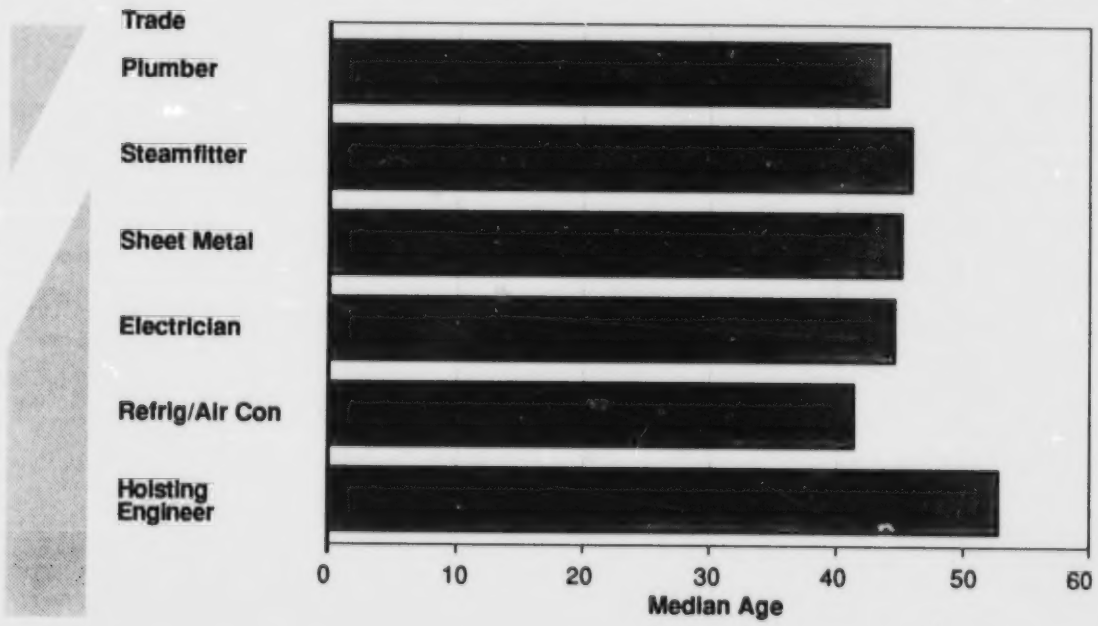
CHAPTER 6

RETIREMENT PATTERNS AND ESTIMATED REPLACEMENT NEEDS

The ageing of Ontario's work force has become of considerable concern in recent years because it will ultimately lead to substantial replacement needs in many occupations as retirements increase. From the survey, a clearer picture of the stock and age structure of the labour force in the six trades has been obtained, which provides a more precise basis for estimating retirement patterns and replacement needs in these trades.

The median ages of certificate holders in the labour force are shown in Chart 6 for each of the six trades. Hoisting engineers have the highest average age, at 52.4 years. The trade with the youngest work force is refrigeration and air conditioning mechanic with a median age of 41.1 years.

Chart 6
Median Age of Certificate Holders in the Labour Force by Trade



The work force in these six trades is considerably older than the rest of the adult male labour force: the median age of the male labour force (defined as those aged 20 or more) was 36.5 years at the time of the 1986 census.

By advancing the age of the labour force in these trades by ten years and applying trade specific labour force participation rates by age and death rates for Ontario males by age, losses to the stock of qualified workers in the six trades over the next decade can be estimated.

It is estimated that attrition will reduce the labour force in the six trades by 15,380 workers -- about one-quarter of the existing stock of workers -- over the next ten years. As a proportion of the current labour force (and

Table 10

Estimates of Attrition from the Labour Force Due to Retirement and Deaths by Trade, Ontario, 1988-1998

	Attrition	
Trade	Number	Percent
Plumber	2,880	24
Steamfitter	1,060	24
Sheet Metal	1,290	20
Electrician	6,960	23
Refrigeration and Air Conditioning	470	18
Hoisting Engineer	2,720	38
Total	15,380	24

consistent with the age patterns in Chart 6) losses will be highest in the hoisting engineer trade (38%) and lowest for refrigeration and air conditioning mechanics (18%). In absolute terms, replacement needs will be highest for electricians: close to 7,000 are expected to leave the labour force over the next ten years.

A fundamental question is whether the volume of new qualified workers entering the labour force will be sufficient to meet these replacement needs. This is a difficult question to answer with a high degree of certainty because of the variables which influence the flow of apprentices through the training system.

Foremost of these is economic growth and the level of activity in the construction industry. Apprenticeship training programs -- the primary source of new entrants into the trades -- are employer driven. During periods of economic expansion employers are much more willing to take on new apprentices. Periods of slack or cyclical downturns in the construction industry impact negatively on the volume of apprenticeship training. Under seniority rules, apprentices are among the first workers laid off during a downturn, and the number of opportunities for persons to enter into apprenticeship training programs also constricts substantially.[8] Consequently, during periods of economic slowdown the volume of apprenticeship training declines, which contributes to the shortages of skilled workers the industry faces during a subsequent recovery in economic growth and upswing in construction activity.

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[8]For a discussion of the sensitivity of apprenticeship training to the business cycle, see; Adjusting to Change: An Overview of Labour Market Issues in Ontario, Ontario Ministry of Skills Development, Toronto, June 1989, Chapter 3, pp 26-28.

The record of new apprenticeship registrations and completions from 1984-85 to 1988-89 confirms that the training system is positively affected by an upswing in economic activity. Between 1984 and 1988 the real total dollar value of construction activity in Ontario increased by 47 percent.[9] Over this same period, the number of new apprentice registrations and completions for each trade, with the exception of steamfitter and hoisting engineer, increased substantially (Table 11).

Table 11

Registrations, Cancellations and Completions in the Apprenticeship Training Program by Trade, Ontario, Fiscal Years 1984-85 to 1988-89

Registrations, Cancellations, and Completions	Plumber	Steam-fitter	Sheet Metal	Elect-rician	Refriger-ation & Air Cond.	Hoisting Engineer
New Registrations						
1984-85	395	63	277	924	243	40
1985-86	496	78	330	1,167	240	40
1986-87	590	90	411	1,646	252	36
1987-88	725	82	409	1,631	281	38
1988-89	711	75	434	1,582	304	52
Cancellations						
1984-85	106	44	103	245	66	16
1985-86	122	37	101	245	60	4
1986-87	142	28	96	258	78	11
1987-88	96	27	76	228	71	9
1988-89	137	37	90	274	64	5
Completions						
1984-85	230	57	154	573	110	0
1985-86	258	88	180	692	74	20
1986-87	244	81	177	631	188	20
1987-88	248	83	175	563	124	25
1988-89	302	60	185	644	120	23

Source: Apprenticeship Branch, Ministry of Skills Development

[9]Conference Board of Canada.

To obtain some insight into whether or not replacement needs will be met, assume that the average number of completions for the years 1984-85 to 1988-89 will be the same over the next decade. On this basis, the number of apprenticeship completions over the ten year period by trade would be as follows:

Plumber	2,580
Steamfitter	730
Sheet Metal	1,740
Electrician	6,210
Refrigeration and Air Conditioning	1,230
Hoisting Engineer	180
	12,670

A comparison between estimated replacement needs from Table 10 and number of new entrants (completions) as estimated above leads to the conclusion that additions to the stock of certificate holders in the six trades would fall short of replacement needs by about 2,710 over the next decade. New entrants would fall short of replacements for the trades of plumber, steamfitter, electrician and hoisting engineer. For hoisting engineer, the shortfall would be most severe.

The above analysis, of course, is simplistic and does not take into account the fact that new registrations increased substantially for the trades of plumber, sheet metal and electrician over the past five years. How many of these new registrations will successfully complete their training programs, however, will depend on economic conditions.

If the economy were to grow more slowly, the construction industry would move to a lower level of activity. This will lead not to just lower levels of new apprenticeship registrations but to a lower ratio of apprentice registrations to completions as apprentices are laid off

during a downturn. This will lead to a delay in their training and lead a number of them to cancel their training programs and seek employment in other industries.

As well, there will be a number of cancellations by apprentices unrelated to business conditions. As shown in Table 11, even during favourable economic conditions, some apprentices leave their training programs to pursue other careers because of personal preferences.

If severe shortages develop because replacement needs are not met through the provincial training program, recruitment of qualified workers from other countries to circumvent shortages might be pursued. The evidence in recent years, however, strongly suggests that employers will find it very difficult to successfully pursue this option. The number of immigrants coming to Ontario in recent years who report one of the six trades studied in this report as their intended occupation has been very small.

Interprovincial migration is potentially another source of qualified workers to meet future needs. This option, however, depends very much on variation in economic growth between Ontario and other regions, especially Western Canada. Reliance on this option as a partial solution would be a risky proposition as expansion of resource based industries in the West over the next decade would substantially deter movements of workers to Ontario.

While the foregoing assessment of new entrants is speculative in nature, the ageing of the work force and retirements which will give rise to substantial replacement needs for a number of trades is a reality. Unless matched by a sufficient number of new entrants these replacement needs have the potential to create shortages of qualified workers over the next decade. Those who are partners in delivering

apprenticeship training programs -- employers, industry associations, trade unions and governments --should work together to obtain an in-depth understanding of these issues and to develop strategies to ensure replacement needs will be met. Otherwise, shortages of qualified workers in the trades over the next decade will persist and create bottlenecks which can restrict economic expansion.

CHAPTER 7

SKILLS UPGRADING REQUIREMENTS

As outlined in Chapter 5, the construction industry labour market is dynamic. Workers in the construction trades must be adaptable because demands for their services tend to be project driven. The industry is also dynamic in another dimension -- technological innovations. More sophisticated materials, tools, equipment, machinery and construction techniques are constantly being introduced making it necessary for workers to update their skills.

For these reasons, one objective of the survey was to identify the need for skills upgrading and the types of skills upgrading workers see as having the highest priority. The results from this part of the research project are presented in this chapter.

Urgency of Need for Skills Updating

With respect to whether skills updating is perceived as an important issue, about 50 percent of certificate holders believe that the need for skills updating is either very or somewhat urgent (Table 12).

By trade, skills updating was seen as most important by electricians, 60.4 percent of whom said skills updating was either very or somewhat urgent, and was viewed as least important by hoisting engineers, 32.8 percent of whom said updating was very or somewhat urgent.

Table 12

Urgency of Personal Need for Skills Updating Among Employed Certificate Holders by Trade, Ontario, October, 1988

Trade	Total*	Urgency of Need				
		Very or Somewhat Urgent %	Not Very Urgent %	Not at All Urgent %	Don't Know %	Not Specified %
Plumber	11,931	42.0	26.8	18.8	5.4	7.1
Steamfitter	4,266	44.3	30.3	17.5	3.1	4.9
Sheet Metal	6,321	40.3	31.8	17.6	3.7	6.6
Electrician	29,788	60.4	24.8	8.3	2.0	4.6
Refrigeration and Air Conditioning	2,604	52.0	29.5	12.2	1.4	4.9
Hoisting Engineer	7,089	32.8	25.3	25.3	7.8	8.9
Total*	62,001	50.1	26.5	14.0	3.6	5.8

* May not sum to total or to 100 percent due to rounding.

In regards to awareness of opportunities to update their skills, about 22 percent of all employed certificate holders were aware of the Trades Updating Program sponsored by the Ministry of Skills Development.

Awareness of the Trades Updating Program was highest among those who work with the tools of the trade. Those working in other industries, or in unrelated blue collar jobs, or in managerial/supervisory jobs were less aware. By trade, sheet metal workers were most aware of the Trades Updating Program (26.2%) and refrigeration and air conditioning mechanics were least aware (12.9%).

As another indicator of importance attached to upgrading of skills, almost 83 percent of those who were not aware of Trades Updating Program indicated that they would like to obtain information on the program.

Table 13

Awareness of Trades Updating Program Among Employed Certificate Holders by Trade, Ontario, October, 1988

Trade	Total	Aware of Program %	Not Aware of Program %	Not Specified %
Plumber	11,931	17.8	77.5	4.8
Steamfitter	4,266	19.5	77.1	3.4
Sheet Metal	6,322	26.2	69.1	4.7
Electrician	29,788	21.9	74.8	3.3
Refrigeration and Air Conditioning	2,604	12.9	84.3	2.7
Hoisting Engineer	7,089	33.2	62.0	4.9
Total	62,001	22.3	73.8	3.9

Types of Skills Updating Required

Respondents to the survey were asked to report the most important area of skills updating they themselves needed. Based on this information, the top five priority training needs for each trade are shown in Table 14. (More details on the ranking of skills updating priorities, along with definitions, are provided in Appendix I.)

With the exception of plumber, training in use of computers is one of the top five priority training needs among all trades. Electronics is an important area for skills updating for plumbers, refrigeration and air conditioning mechanics, and electricians, while for sheet metal workers and steamfitters training to upgrade skills in schematic reading is viewed as a high priority.

Management training is seen as a priority in three trades--plumber, sheet metal and electrician -- which reflects the fact that many certificate holders establish their own business or more into managerial/supervisory positions.

Table 14

Top Five Priority Training Needs by Trade

Plumber:

CODE UPDATING
TRAINING/INFORMATION ON NEW TECHNOLOGY
MANAGEMENT TRAINING
SUPERVISORY TRAINING
ELECTRONICS

Steamfitter:

COMPUTER TRAINING
PRESSURE PIPE WELDING
HYDRAULICS/PNEUMATICS
SCHEMATIC READING
TRAINING INFORMATION ON NEW TECHNOLOGY

Sheet Metal:

LAYOUT PROCEDURES
COMPUTER TRAINING
PRESSURE PIPE WELDING
SCHEMATIC READING
MANAGEMENT TRAINING

Electrician:

ELECTRONICS
PLC TRAINING*
COMPUTER TRAINING
MANAGEMENT TRAINING
CODE UPDATING

Refrigeration and Air Conditioning:

ELECTRONICS
ELECTRONIC TROUBLESHOOTING
COMPUTER TRAINING
ELECTRONIC CONTROLS
TRAINING/INFORMATION ON NEW TECHNOLOGY

Hoisting Engineer:

EQUIPMENT HANDLING
TRAINING/INFORMATION ON NEW TECHNOLOGY
SAFETY
COMPUTER TRAINING
MANUAL PROCEDURES

*PLC training: computerised control systems, programmable controller, other forms of computerised computer control.

APPENDIX I

PRIORITY SKILLS UPDATING NEEDS IDENTIFIED BY EMPLOYED CERTIFICATE HOLDERS BY TRADE

TABLE 1

PRIORITY TRAINING NEEDS OF EMPLOYED PLUMBERS BASED ON PERSONAL IDENTIFICATION OF TRAINING NEEDS*

TRAINING NEED**	ESTIMATED NUMBER
CODE UPDATING (22)	1215
TRAINING/INFORMATION ON NEW TECHNOLOGY (19)	667
MANAGEMENT TRAINING (1)	542
SUPERVISORY TRAINING	310
ELECTRONICS (4)	304
REFRIGERATION/ AIR CONDITIONING	296
SCHEMATIC READING (13)	271
JOB ESTIMATING/ BUDGETING	267
PRESSURE PIPE WELDING	240
HYDRAULICS/PNEUMATICS	216
COMMUNICATION TRAINING	151
COMPUTER TRAINING (3)	144
INSTRUMENTATION (12)	136
SPECIFIC SCIENCES (23)	120
EQUIPMENT HANDLING (17)	117
LEARNING METRIC SYSTEM	116
SERVICE/MAINTENANCE	107
ATTITUDE/OUTLOOK	105
SAFETY (21)	98
MANUAL PROCEDURES (18)	96
PLC TRAINING (2)	88
BOOKKEEPING/ACCOUNTING	85
DRAFTING/DESIGN	82
TIME MANAGEMENT	50

* IN THIS TABLE ONLY TRAINING NEEDS IDENTIFIED BY 50 OR MORE CERTIFICATE HOLDERS ARE LISTED.

** NUMBERS IN BRACKETS REFER TO A MORE DETAILED DESCRIPTION OF THE TRAINING NEEDS IDENTIFIED BY THE RESPONDENTS. THESE DESCRIPTIONS APPEAR AT THE END OF THIS APPENDIX.

TABLE 2

PRIORITY TRAINING NEEDS OF EMPLOYED STEAMFITTERS BASED ON PERSONAL IDENTIFICATION OF TRAINING NEEDS*

TRAINING NEED**	ESTIMATED NUMBER
COMPUTER TRAINING (3)	253
PRESSURE PIPE WELDING (7)	231
HYDRAULICS/PNEUMATICS	176
SCHEMATIC READING (13)	173
TRAINING/INFORMATION ON NEW TECHNOLOGY (19)	165
INSTRUMENTATION (12)	161
MANAGEMENT TRAINING (1)	134
SAFETY (21)	115
COMMUNICATION TRAINING (25)	108
SUPERVISORY TRAINING	96
ELECTRONICS (4)	88
EQUIPMENT HANDLING (17)	87
HEATING/REFRIGERATION	87
SPECIFIC SCIENCES (23)	84
PLC TRAINING (2)	73
JOB ESTIMATING/ BUDGETING	64

* IN THIS TABLE ONLY TRAINING NEEDS IDENTIFIED BY 50 OR MORE CERTIFICATE HOLDERS ARE LISTED.

** NUMBERS IN BRACKETS REFER TO A MORE DETAILED DESCRIPTION OF THE TRAINING NEEDS IDENTIFIED BY THE RESPONDENTS. THESE DESCRIPTIONS APPEAR AT THE END OF THIS APPENDIX.

TABLE 3

PRIORITY TRAINING NEEDS OF EMPLOYED SHEET METAL WORKERS BASED ON PERSONAL IDENTIFICATION OF TRAINING NEEDS*

TRAINING NEED**	ESTIMATED NUMBER
LAYOUT PROCEDURES (6)	727
COMPUTER TRAINING (3)	448
PRESSURE PIPE WELDING (7)	375
SCHEMATIC READING (13)	237
MANAGEMENT TRAINING (1)	233
TRAINING/INFORMATION ON NEW TECHNOLOGY (19)	222
REFRIGERATION/ AIR CONDITIONING	206
DRAFTING/DESIGN	175
JOB ESTIMATING/ BUDGETING	162
COMMUNICATION TRAINING (25)	131
SERVICE/MAINTENANCE	101
EQUIPMENT HANDLING (17)	87
DUCT SYSTEMS	82
MANUAL PROCEDURES (18)	80
UPDATING CODES (22)	72
SAFETY (21)	68
SUPERVISORY TRAINING	67
ELECTRONICS (4)	63
NEW THEORY/TECHNIQUES (20)	56
SPECIFIC SCIENCES (23)	54

* IN THIS TABLE ONLY TRAINING NEEDS IDENTIFIED BY 50 OR MORE CERTIFICATE HOLDERS ARE LISTED.

** NUMBERS IN BRACKETS REFER TO A MORE DETAILED DESCRIPTION OF THE TRAINING NEEDS IDENTIFIED BY THE RESPONDENTS. THESE DESCRIPTIONS APPEAR AT THE END OF THIS APPENDIX.

TABLE 4

PRIORITY TRAINING NEEDS OF EMPLOYED ELECTRICIANS BASED ON PERSONAL IDENTIFICATION OF TRAINING NEEDS*

TRAINING NEED**	ESTIMATED NUMBER
ELECTRONICS (4)	5975
PLC TRAINING (2)	4613
COMPUTER TRAINING (3)	3072
MANAGEMENT TRAINING (1)	1056
CODE UPDATING (22)	929
TRAINING/INFORMATION ON NEW TECHNOLOGY (19)	927
ELECTRONIC CONTROLS	904
ELECTRONIC TROUBLESHOOTING (11)	678
MOTOR CONTROLS	597
ROBOTICS	471
COMMUNICATION TRAINING (25)	445
SCHEMATIC READING (13)	441
JOB ESTIMATING/ BUDGETING	353
INSTRUMENTATION (12)	265
SUPERVISORY TRAINING	255
MANUAL PROCEDURES (18)	250
REFRIGERATION/ AIR CONDITIONING	245
FIRE ALARM	213
EQUIPMENT HANDLING (17)	202
MECHANICS & ENGINEERING	192
TIME MANAGEMENT	157
SAFETY (21)	141
NEW THEORY/TECHNIQUES (20)	132
BOOKEEPING/ACCOUNTING	112
SERVICE/MAINTENANCE	100
DRAFTING/DESIGN	88
ATTITUDE/OUTLOOK	76
SPECIFIC SCIENCES (23)	69
FIBRE OPTICS	63
LEARNING METRIC SYSTEM	63
PUBLIC RELATIONS	53

* IN THIS TABLE ONLY TRAINING NEEDS IDENTIFIED BY 50 OR MORE CERTIFICATE HOLDERS ARE LISTED.

** NUMBERS IN BRACKETS REFER TO A MORE DETAILED DESCRIPTION OF THE TRAINING NEEDS IDENTIFIED BY THE RESPONDENTS. THESE DESCRIPTIONS APPEAR AT THE END OF THIS APPENDIX.

TABLE 5

PRIORITY TRAINING NEEDS OF EMPLOYED REFRIGERATION/AIR CONDITIONING MECHANICS BASED ON PERSONAL IDENTIFICATION OF TRAINING NEEDS*

TRAINING NEED**	ESTIMATED NUMBER
ELECTRONICS (4)	559
ELECTRONIC TROUBLESHOOTING (11)	166
COMPUTER TRAINING (3)	142
ELECTRONIC CONTROLS	132
TRAINING/INFORMATION ON NEW TECHNOLOGY (19)	131
PLC TRAINING (2)	104
REFRIGERATION/ AIR CONDITIONING	92
MANAGEMENT TRAINING (1)	79
COMMUNICATION TRAINING (25)	53
SCHEMATIC READING (13)	51

* IN THIS TABLE ONLY TRAINING NEEDS IDENTIFIED BY 50 OR MORE CERTIFICATE HOLDERS ARE LISTED.

** NUMBERS IN BRACKETS REFER TO A MORE DETAILED DESCRIPTION OF THE TRAINING NEEDS IDENTIFIED BY THE RESPONDENTS. THESE DESCRIPTIONS APPEAR AT THE END OF THIS APPENDIX.

TABLE 6

PRIORITY TRAINING NEEDS OF EMPLOYED HOISTING ENGINEERS BASED ON PERSONAL IDENTIFICATION OF TRAINING NEEDS*

TRAINING NEED**	ESTIMATED NUMBER
EQUIPMENT HANDLING (17)	760
TRAINING/INFORMATION ON NEW TECHNOLOGY (19)	488
SAFETY (21)	269
COMPUTER TRAINING (3)	255
MANUAL PROCEDURES (18)	197
ELECTRONICS (4)	121
NEW THEORY/TECHNIQUES (20)	120
HYDRAULICS/PNEUMATICS	116
COMMUNICATION TRAINING (25)	111
ATTITUDE/OUTLOOK	94
UPDATING CODES (22)	94
MANAGEMENT TRAINING (1)	85
SERVICE/MAINTENANCE	80
MECHANICS & ENGINEERING	62
PRESSURE PIPE WELDING	58
SUPERVISORY TRAINING	57
LOAD CHART READING	55
SPECIFIC SCIENCES (23)	50

* IN THIS TABLE ONLY TRAINING NEEDS IDENTIFIED BY 50 OR MORE CERTIFICATE HOLDERS ARE LISTED.

** NUMBERS IN BRACKETS REFER TO A MORE DETAILED DESCRIPTION OF THE TRAINING NEEDS IDENTIFIED BY THE RESPONDENTS. HESE DESCRIPTIONS APPEAR AT THE END OF THIS APPENDIX.

DESCRIPTION OF CODES FOR SKILLS UPGRADING NEEDS

CODE	DESCRIPTION
01	MANAGEMENT TRAINING - TRAINING IN ALL ASPECTS OF RUNNING A BUSINESS, BETTER OFFICE MANAGERIAL TRAINING.
02	P.L.C. TRAINING - COMPUTERIZED CONTROL SYSTEM FOR THE HVA TRADE, PROGRAMMABLE CONTROLLER, OTHER FORMS OF COMPUTER PERIPHERAL CONTROL.
03	COMPUTER TRAINING - TRAINING IN USE OF COMPUTERS, P.C. SOFTWARE AND APPLICATIONS.
04	ELECTRONICS - BASIC ELECTRONICS, INDUSTRIAL ELECTRONICS, UPGRADING COURSES IN THE ELECTRICAL FIELD.
06	LAYOUT PROCEDURES - NEED FOR MORE MATERIAL LAYOUT, PATTERN LAYOUT TRAINING.
11	ELECTRONIC TROUBLESHOOTING - COURSE ON TROUBLESHOOTING INTEGRATED CIRCUITS.
12	INSTRUMENTATION COURSES - CALIBRATION OF INSTRUMENTS, INSTRUMENTATION (CALIBRATION).
13	INDUSTRIAL BLUEPRINT READING - WIRING DIAGRAMS AND STRUCTURAL, ABILITY TO READ DRAWINGS, SCHEMATIC WIRING DIAGRAMS, BLUEPRINT READING.
17	TRAINING ON HANDLING EQUIPMENT - MORE TECHNICAL TRAINING REQUIRED ON EQUIPMENT BEING WORKED ON FREQUENTLY, MATERIAL HANDLING EQUIPMENT, HYDRAULICS.
18	TRAINING ON MANUAL PROCEDURES - DIFFERENT WAYS OF RIGGING MATERIAL THAT ARE VERY DIFFICULT TO LIFT BECAUSE OF SIZE AND SHAPE.
19	TRAINING/INFORMATION ABOUT NEW EQUIPMENT/TECHNOLOGIES - TRAINING FOR NEW TYPE EQUIPMENT E.G. HYDRAULIC CRANE, INFORMATION ON NEW SYSTEMS IN NEW BUILDINGS, DEMONSTRATION ON NEW TECHNOLOGIES, UPDATE ON NEW EQUIPMENT.

CODE	DESCRIPTION
20	TRAINING ON NEW THEORY/TECHNIQUES - NEW TECHNIQUES, THEORY ON NEW SYSTEMS THAT ARE BEING DEVELOPED, UPDATING OF TECHNICAL DATA, FORMING AND ASSEMBLY TECHNIQUES.
21	SAFETY - TRAINING TO IMPROVE SAFETY ON THE JOB, SAFE RIGGING PROCEDURES.
22	UPDATING CODES - UPDATED COURSES ON THE ONTARIO ELECTRICAL SAFETY CODE, PLUMBING CODE UPDATE, UPGRADING COURSES TO KEEP THE TRADESMEN AT PAR WITH CODES, ACCESSIBILITY TO CHANGES OF LAWS AND RULES CONCERNING SHEET METAL DUCTWORK, TRAINING IN UP-TO-DATE ELECTRICAL AND FIRE CODES, EASIER ACCESS TO BUILDING AND FIRE CODES.
23	TRAINING IN SPECIFIC SCIENCES - MATH, PHYSICS, CHEMISTRY.
25	COMMUNICATION TRAINING - INTERGROUP COMMUNICATIONS, PROBLEM SOLVING - DIALOGUE.

APPENDIX II

QUESTIONNAIRE

Ontario

Ministry of Skills Development

Ministère de la Formation professionnelle

Ninth Floor
Mowat Block
Queen's Park
900 Bay Street
Toronto, Ontario
M7A 1L2

(416) 963-3114

August 29, 1988

As you may know the Ministry of Skills Development is now responsible for apprenticeship training programs and tradesmen's qualifications in the Province of Ontario.

In this regard, we have engaged the Canadian Gallup Poll to conduct a survey of Certificate of Qualification holders in the construction trades in order to obtain information on the areas and industry sectors in which they work and their views on technical upgrading of skills. As part of the sample of the group being surveyed, please take a few moments to complete the questionnaire and return it in the stamped return envelope provided. Your answers will assist us in planning for the future, and strengthening apprenticeship and other training programs for your trade.

Your co-operation is greatly appreciated.

Yours truly,

Peter Landry
Director of Apprenticeship

Note: Si vous préférez recevoir ce questionnaire en français veuillez s.v.p. contacter Suzanne Lafortune, Gallup Canada, (416) 961-2811 (à frais virés si nécessaire).

NOTE: IF YOU HOLD MORE THAN ONE JOB, PLEASE REFER TO YOUR USUAL OR MAIN JOB ONLY WHEN ANSWERING THE FOLLOWING QUESTIONS.

1. Are you currently working at a job? **(CIRCLE ONE)**

Yes 1 No 2

2. If No, are you waiting to begin a job with a definite start date? **(CIRCLE ONE)**

Yes 1 No 2 **(IF NO PLEASE GO TO QUESTION 15)**

PLEASE ANSWER QUESTIONS 3 TO 15 ONLY IF CURRENTLY WORKING AT A JOB OR WAITING TO START A JOB.

3. Is your job in the construction industry? **(CIRCLE ONE)**

Yes 1

CIRCLE AS MANY AS APPLY.

1 Residential

2 Industrial, Commercial, Institutional

3 Heavy Industry/Utilities

4 Service and Maintenance

5 Renovation

6 Other Construction Services (e.g. project management, inspection, etc.)

PLEASE GO TO QUESTION 5.

No 2

CIRCLE THE ONE CATEGORY BELOW THAT MOST CLOSELY DESCRIBES THE INDUSTRY IN WHICH YOU WORK.

1 Primary Industries (e.g. logging, mining, farming)

2 Manufacturing Industries

3 Transportation and Communications

4 Retail and Wholesale Merchandising

5 Education

6 Government (Federal/Provincial/Municipal)

7 Service (e.g. finance, health care, recreation, etc.)

8 Other - please specify _____

PLEASE GO TO QUESTION 4.

4. Have you ever worked in construction at any time in the past **(CIRCLE ONE)**

Yes 1 No 2 **(IF NO PLEASE GO TO QUESTION 5)**

A. If Yes, how long ago was that? _____ years.

B. What was your main reason for leaving construction work?

_____

C. How likely do you think it is that you will work in construction at some time in the future? **(CIRCLE ONE)**

1	2	3	4	5
Very Likely	Somewhat Likely	Somewhat Unlikely	Very Unlikely	Don't Know

5. Are you an employee, or are you self-employed? **(CIRCLE ONE)**

   Employee 1 Self-Employed 2 **(PLEASE GO TO QUESTION 7)**

6. Do you obtain work through a hiring hall? **(CIRCLE ONE)**

   Yes 1 No 2

7. How long have you worked for your present employer, OR if Self-Employed, how long have you been self-employed?

   Years _____ If less than two years, how many separate employers have you had in the past two years? _____

8. What is your present job title? **(PLEASE BE SPECIFIC)**

   _____

9. Describe the main duties and activities you perform regularly in your work: **(PLEASE BE SPECIFIC)**

   _____

   _____

   _____

   _____

10. How long have you worked at a job involving much the same duties and activities as your present job? _____ Years

11. As you know, new technologies are being introduced in many areas of the work world to improve the efficiency and quality of production. These create the need for workers to update existing skills and acquire new ones.

    Based on your work experience, please list below the one most important skill for which you think training should be offered to help journeymen in your trade to upgrade their skills.

    _____

    _____

12. How urgent do you feel the need for skills updating is for journeymen in general? **(CIRCLE ONE)**

1	2	3	4	5
Very Urgent	Somewhat Urgent	Not Very Urgent	Not at all Urgent	Don't Know

13. Based on your work experience, please list below the one most important skill for which you think training should be offered to help you personally to upgrade your skills. **(PLEASE BE SPECIFIC)**

    _____

    _____

14. How urgent do you feel the need for skills updating is for you personally? **(CIRCLE ONE)**

1	2	3	4	5
Very Urgent	Somewhat Urgent	Not Very Urgent	Not at all Urgent	Don't Know

15. Are you aware of the Trades Updating Program offered by the Ontario Ministry of Skills Development under the Ontario Training Strategy? **(CIRCLE ONE)**

Yes 1 ▼

If Yes - How did you learn about it?

_____

_____

_____

No 2 ▼

If No, please check below if you would like to receive additional information.

❑ I would like to receive additional information on the Trades Updating Program.

PLEASE ANSWER QUESTIONS 16 TO 18 <u>ONLY IF NOT CURRENTLY EMPLOYED.</u>

16. Are you currently looking for work? **(CIRCLE ONE)**

Yes 1 ▼

If Yes, how long have you been looking for work?

❑ Less than one week

OR

Please give the number of weeks _____.

No 2 ▼

If NOT looking for work, please indicate the one main reason: (e.g. health, family responsibilities, retired, attending school, etc.)

_____

_____

17. Please state your last job title: **(PLEASE BE SPECIFIC)**

_____

18. Please describe the main duties and activities you performed regularly in your last job: **(PLEASE BE SPECIFIC)**

_____

_____

_____

_____

_____

THANK YOU FOR PARTICIPATING IN THIS SURVEY!

This information is collected under the authority of the Apprenticeship and Trademen's Qualification Act, R.S.O. 1980. The purpose of this survey is to obtain information about employment characteristics and views of the skills updating needs of journeymen. For more information contact the Director, Apprenticeship Branch, 9th Floor, Mowat Block, 900 Bay Street, Toronto, Ontario M7A 2B5.

APPENDIX III

TECHNICAL REPORT ON SURVEY DESIGN AND METHODOLOGY

Technical Report on Survey Methodology

1. Sample Selection

The data analysed in this report were collected through a mail sample of 14,903 Certificate of Qualification holders, registered with the Ministry of Skills Development, in the following six construction trades: Plumber; Steamfitter; Sheet Metal Worker; Electrician; Refrigeration and Air Conditioning Mechanic; and, Hoisting Engineer.

To increase sampling efficiency the sample was stratified by the six trades and by five Economic Regions: namely, Central; Southwest; East; Northeast; and, Northwest.

One of the major considerations in determining sample size concerns the level of error deemed tolerable or acceptable. Sample tolerances are determined by the sample design. In general, the sampling plan for this survey, assuming maximum variance in the characteristic being measured, e.g., 50 percent work with the tools and 50 percent do not, was designed to obtain estimates derived from the sample that, 19 times out of 20, are expected to be within:

- plus or minus 1.1 percent of the true value with reference to all C of Q holders;
- plus or minus 2.5 percent with reference to a particular region (all trades combined);
- plus or minus 2.7 percent with reference to a particular trade province-wide; and,
- plus or minus 6.0 percent with reference to estimates for a particular trade in a single region.

The actual sampling error rates obtained depended, of course, on the response rate, which not surprisingly varied slightly across regions and trades. In general, obtained rates are very close to those planned. Detailed planned and obtained sampling error rates are given in Tables III.a and III.b below.

Frequencies of different population characteristics, i.e, by age, trade, and region were generated for the population file, sample, and response file and compared in order to assess the representativeness of the sample. In all cases the response file was extremely representative of the sample file which in turn was representative of the population (see Table III.c and Table III.d below).

2. Survey Instrument

The survey data were collected by means of a questionnaire designed by the Ministry of Skills Development to elicit training and employment-related information. The questionnaire consisted of a total of 18 questions. Of these, 15 were directed at Certificate of Qualification holders who were in the labour force at the time of the survey (see Appendix II).

3. Data Collection

Gallup Canada, Inc. was contracted to perform the data collection stages of the survey. Their responsibilities included:

- assigning and matching the identification number on the questionnaire and the mail-out envelope;
- conducting a mail-out and logging returns;
- developing a coding system in consultation with the Ministry of Skills Development;
- editing and coding responses;
- producing a data tape.

4. Survey Response

Questionnaires were mailed to a total sample of 14,903 registered certificate holders in the six trades in September, 1988. A mail reminder was issued to those who did not respond within six weeks. A total survey response rate of 44 percent was obtained. Based on the evidence in the technical appendix, respondents appear to be an unbiased representation of the target population.

TABLE 111.a

SAMPLING ERROR RATES
FOR PRELIMINARY SAMPLE PLAN

	REGION					
TRADE	CENTRAL	SOUTHWEST	EAST	NORTH EAST	NORTH WEST	TOTAL
Plumber	±6.0%	±6.0%	±6.0%	±6.0%	±6.0%	±2.7%
Steamfitter	±6.0%	±6.0%	±6.0%	±6.0%	±6.0%	±2.7%
Sheet Metal Worker	±6.0%	±6.0%	±6.0%	±6.0%	±6.0%	±2.7%
Electrician	±6.0%	±6.0%	±6.0%	±6.0%	±6.0%	±2.7%
Refrigeration/ Air Conditioning Mechanic	±5.7%	±5.7%	±5.7%	±5.7%	±5.7%	±2.6%
Hoisting Engineer	±6.0%	±6.0%	±6.0%	±6.0%	±6.0%	±2.7%
TOTAL	±2.5%	±2.5%	±2.5%	±2.5%	±2.5%	±1.1%

TABLE III.b

SAMPLING ERROR RATES
FOR THE SAMPLE OBTAINED

	REGION					
TRADE	CENTRAL	SOUTHWEST	EAST	NORTH EAST	NORTH WEST	TOTAL
Plumber	±6.3%	±7.2%	±5.1%	±5.0%	±6.3%	±2.9%
Steamfitter	±5.5%	±4.4%	±5.7%	±7.2%	±6.0%	±2.6%
Sheet Metal Worker	±6.1%	±4.6%	±6.1%	±7.6%	±6.3%	±2.8%
Electricians	±5.8%	±5.9%	±5.3%	±5.0%	±5.5%	±2.5%
Refrigeration/ Air Conditioning Mechanic	±7.1%	±4.7%	±14.7%	±12.2%	±6.5%	±3.2%
Hoisting Engineer	±6.2%	±6.5%	±5.9%	±5.6%	±6.3%	±2.8%
TOTAL	±2.6%	±2.2%	±2.6%	±2.7%	±2.6%	±1.2%

Note: Assuming maximum variance (P=.5); error bands are narrower where there is less variance.

TABLE III.c

AGE DISTRIBUTION IN THE POPULATION, SAMPLE, AND RESPONSE FILES
(Percent)

	Population File	Sample File	Response File	
			Unweighted	Weighted
AGE				
16-24	0.5	0.4	0.4	0.5
25-34	17.3	16.4	17.6	17.6
35-44	28.0	27.8	28.1	28.8
45-54	22.5	22.2	21.5	20.9
55-64	20.2	21.1	20.6	21.7
65+	11.6	12.0	11.8	10.5
Frequency	75,004	14,903	6,545	74,952

TABLE III.d

DISTRIBUTION BY REGION AND TRADE IN THE SAMPLE AND RESPONSE FILES
(Percent)

	Sample File	Response File
REGION		
Eastern	20.0	20.2
Central	29.9	29.7
Northwest	16.2	16.8
Northeast	13.9	13.9
Southwest	20.0	19.4
TRADE		
Plumber	18.0	18.2
Steamfitter	18.0	17.4
Sheetmetal	18.0	18.4
Electrician	18.1	18.8
Refrigeration/Air Conditioning Mechanic	9.9	10.1
Hoisting Engineer	18.0	17.1
Frequency	14,903	6,545